

XIII.—*Organographic and Physiologic Sketch of the Class Fungi*, by C. MONTAGNE, D.M. *Extracted from* ‘*Histoire physique, politique et naturelle de l’île de Cuba,*’ par M. RAMON DE LA SAGRA, *and translated and illustrated with short notes by the Rev. M. J. BERKELEY, M.A., F.L.S.*

[Continued from p. 10.]

Gasteromycetes, Fr.

A SIMPLE or compound receptacle (*peridium*, *uterus*), formed by the union of cells or interlaced filaments, presents the essential character of this family, which, like the preceding, is divided into two grand sections, *Angiogastres* and *Trichospermæ*.

The *Angiogastres* are at once distinguished by having their sporidia, which are never pulverulent, contained either in mucilaginous generally foetid matter, itself enclosed in a general peridium (*Phalloideæ*), or in partial receptacles formed by folds of the common receptacle (*Tuberaceæ*), or lastly in proper peridia, named *sporangia*, and included in a common peridium (*Nidulariaceæ*).

Not only all the genera of this first subdivision, but almost all the *Gasteromycetes*, are characterized in their young state by a consistence approaching more or less to mucilage. If the whole fungus does not offer this character, some one of its parts does.

The *Trichospermæ* differ principally from *Angiogastres* in having their sporidia free and pulverulent, mixed with simple or complex filaments. This grand section of *Gasteromycetes* itself presents three remarkably distinct forms: 1. *Myxogastres*, whose peridium is organized from mucilage, of which at first the whole fungus consists. 2. *Trichodermaceæ*, in which this organ from the beginning is formed of more or less intimately interlaced filaments. 3. *Lycoperdines*, which present a peridium or receptacle at first fleshy, then coriaceous, into the composition of which enter either cells, or felted fibres. We are going to study the successive changes of the receptacle and sporidia, in the whole series of the genera of this family, proceeding from the simplest forms to the most complex.

In the *Myxogastres*, which, as said above, consist in infancy, without exception, of a diffuent mucilage of various form and colour, we observe, in proportion as this gelatinous medium acquires consistence, either that a crust is formed common to the whole mass divided within into cells, or that a larger or smaller number of individuals separate from it, and are associated on a common stroma. This stroma, which is also called *hypothallus*, is formed by the extremely thin membranous residue of the gelatinous mass from whence the peridia spring. In the first case, a single peridium is produced, which may be regarded as a common peridium, if we consider the inner cells as partial peridia soldered together; or in the second, each individual has its own peridium, resulting from the concretion of the mucilage. This peridium, sessile or stipitate, is composed of one or more membranous, papyraceous, or crustaceous coats. In some cases, if there are two, the outer is crustaceous

and persistent, or extremely thin and membranous, and breaking up into little deciduous scales. The mode of bursting of the organ is also slightly varied. Sometimes an irregular opening is formed at the summit, as in *Physarum*; sometimes it opens like a little box, as *Craterium*; sometimes the upper half falls, leaving a cup-shaped base, as in *Arcyria*; sometimes the membrane is so delicate, that it is broken up entirely into deciduous scales, and leaves the naked capillitium loaded with its sporidia, as in *Stemonitis*. But at the time when the peridium is formed, its cavity is the seat of other changes; that of the sporidia on the one hand, of the filaments or elastic fibres concerned in their dissemination on the other. The filaments on which the sporidia repose are simple or branched, free and loose, or anastomosing so as to form a net. In the *Trichiaceæ** they are spiral, and resemble the elaters of *Hepaticæ*. Stiff and brittle, they are glued and soldered one to another, so as to form the septa of cells in which the sporidia are enclosed (*e. g.* *Spumaria*). These fibres, which by their interlacing compose frequently elegant net-work, are sometimes so supple and elastic, that when the peridium is burst, they rise from the bottom of it resembling a coloured, erect, or drooping plume of the most elegant fashion (*e. g.* *Arcyria*); this is called *capillitium*. In the axis of the peridium, in many species of this section, there is yet another organ, called *columella* or *stylidium*. This, which is sometimes entirely wanting, seems to be the continuation of the stem which penetrates more or less into the peridium, and sometimes traverses its whole extent. It is sometimes rudimental. When the columella exists, the reticulate fibres proceeding from the peridium end, and are fixed upon it.

As regards the sporidia, their metamorphosis takes place at the same time as that of the filaments. Their immense quantity in proportion to the size of the fungus is most remarkable. It seems, indeed, as Fries says, as though the formation of the spores had absorbed all the vegetative force. They separate from the mucilage by the same unknown mechanism which solidifies and fashions all the other organs. That they are at first attached to the filaments, and afterwards separate from it, Mr. Berkeley's observation of the morphosis of the sporidia in many genera of the following section do not allow us to doubt; however this may be, their metamorphosis, studied and described from the life by Corda (*Ic. Fung. ii. p. 22. t. 12. f. 87.*), deserves every attention. We may indeed infer from the figure just quoted, that in *Stemonitis*, where they are at first chained together, their evolution takes place in the joints of a thread, by the continuity of which they were united. If we consult analogy, we are confirmed in this opinion in glancing on what takes place in the morphosis of the sporidia of the genus *Asterophora*†. In some

* Corda, sur les fibres spirales des Trichiacees, Flora, 1838, p. 419. This structure, however, was first noticed by Hedwig, *Obs. Bot. Fasc. i. p. 14. t. 10, 11. 1792*; and again by Kunze, *Myc. Heft ii. p. 94.*—M. J. B.

† Corda, *Ic. Fung. iv. p. 8. t. 3. f. 24.* Messrs. Léveillé and Corda have proved that this genus is parasitic on the pileus of a real Hymenomycete, as the gills are covered with basidia charged with spores. We have also observed the same structure.

Trichia they are at first quaternate, and end by becoming isolated. Some are supported by a pedicel*. After having partaken in their youth of the mucilaginous nature of the medium, they harden by degrees, and undergo with this change of consistence a sort of deformity. Thus, from being spherical, they assume, by a lateral contraction, the form of a grain of coffee or wheat† (*e. g. Stemonitis*). They are, however, always simple when mature, and composed of a single membrane or epispore, and of a homogeneous or heterogeneous nucleus. A great number of the species have sporidia in which are traces of a hilum, a persistent testimony that they were at first attached to a filament performing the functions of an umbilical cord.

Fries has established in this section two grand divisions, founded upon the colour of the sporidia, naming those in which they are of a dusky hue, like that of soot, *lignospermæ*, while those whose sporidia are of a more attractive tint he calls *calospermæ*.

The metamorphosis of *Myxogastres* is a work of Nature as marvellous as it is incomprehensible. It takes place frequently in a few hours‡, and the observer can easily watch all its phases. It is matter of regret, however, that their fluxile nature never allows us to follow step by step the development of the inner parts, as we shall see that we are able to do in the *Angiogastres* and *Trichogastres*.

These fungi grow and multiply under certain meteoric circumstances: the *lignospermæ*, which are very fugitive, on various organized bodies, even on rocks; the *calospermæ* constantly on the trunks of dead trees or rotten wood. The first appear only at certain times and in certain seasons; the latter, being less meteoric, appear indifferently in all. As regards their geographic distribution, as the essential conditions of their growth are moisture combined with heat, we may admit with Fries, that they have their centre in the temperate zone, without however excluding the tropics, where, though less common perhaps, they are by no means absent. I have received from Brazil, Chili, and Cuba, species identical with those of our continent.

The primitive mucilage or medium of the *Myxogastres*, arrested in its morphosis by dryness or any other cause, is frequently indurated, and remains a long time in the form of coloured veins, which have given rise to the genus *Phlebomorpha*, Pers., or sometimes simple hemispherical substances, which on account of their consistence have been regarded as *Sclerotia*.

This is the proper place to advert to the *Sclerotiaceæ* (referred at first by Fries to *Coniomycetes*), and in particular to the typical genus *Sclerotium*. He formerly considered the species of this tribe as formed of a fleshy, very hard stroma, on the circumference of which the sporidia originated. More recently he has regarded the outer envelope as a true peridium, and in this he has been followed by Corda

* Corda, *l. c. i. t. 6. f. 288***.

† They recover their original form when placed in water.—M. J. B.

‡ See *Ann. d. Sc. Nat. Nov. 1841, p. 308, under Trichamphora*.—M. J. B.

(Ic. Fung. iii. p. 18.). Hence the little certainty as to their situation in his different works. The genus *Sclerotium*, whose fruit yet remains to be discovered, is placed by Corda near *Cenococcum*, which enters into the section with which we are occupied. Amongst the *Sclerotia* is the Ergot* (*Spermadia*, Fr., *Sphacelia*, Lév.), too notorious for its deleterious properties, but used to hasten parturition in cases of inactivity of the matrix.

The *Trichodermaceæ* have a peridium, originally formed of more or less closely felted filaments, and it is in this important character especially that the fungi of this order differ from *Myxogastres*. This is not however the only character which distinguishes them from *Myxogastres* or *Lycoperdineæ*; there is this also, viz. the total disappearance of filaments as the sporidia ripen. These filaments exist in an early stage of growth, as I have convinced myself in *Trichoderma viride* and *Onygena equina*. As this tribe is composed of exotic or rare genera, it is difficult to give the history of its morphosis, on which we have no sufficient information †.

The peridium, which is mitriform or spherical, is most frequently sessile (e. g. *Ostracoderma*) ‡. It is stipitate in *Spadonia* and *Pilacre*, and the stem is either cellular, or smooth and fibrous. It is formed, even from the first, of more or less close byssoid filaments; but in almost all the species it opens by abrasion of the summit. In *Ostracoderma* it is smooth, and as it were crustaceous. The sporidia spring evidently, as in the following order, from the threads of which the whole fungus at first consists; and this is I think proved by the fact, that in *Trichoderma viride* they bear a very short filament in the guise of a pedicel. Their form is ovoid or spherical, and their colour various.

The *Lycoperdons* or *Trichogastres* form one of the most remarkable orders in this first section. They are distinguished from those which have been mentioned by being fleshy in their early stage of growth. Here the organization becomes more complicated. We for the first time meet with a membrane formed of threads which produce at their tips naked sporidia. Mr. Berkeley § has shown that in *Lycoperdon calatum*, *gemmatum*, and in *Bovista*, observed at an early stage of growth, the interior flesh (*Gleba*, Fr.) is perforated in every direction by little elongated labyrinthiform cavities, com-

* The ergot is rather a disease produced by a fungus than a fungus itself, and is in fact the effect of a *Fusisporium*. See Linn. Trans., vol. xviii. p. 475, and p. 483.—M. J. B.

† There would I think be little inconvenience in uniting it to the following tribe, since, as in the genus *Cenococcum*, the sporidia of many species of *Mitremyces* are not, at least at the time of maturity, mixed with filaments.

‡ *Institale* is omitted, as the genus is spurious, being made up of the early state of *Coprinus radians*, and *Sphaeria fragiformis* with an *Isaria* growing from its base.—M. J. B.

§ Ann. of Nat. Hist. v. i. p. 81, translated by the author, Ann. des Sc. Nat. 2 série, xii. p. 160. t. 2. [See also an admirable article by Messrs. Tulasne in Ann. Sc. Nat. Jan. 1842, in which *Scleroderma* also is proved to be hymenomycetous.]—M. J. B.

posing a net by their frequent anastomoses. A very thin slice placed under the microscope shows that the inner layer of the walls of these cavities is composed of obtuse, pellucid cells, placed parallel to each other like the pile of velvet, exactly as in the hymenium of a young Agaric. At a later period Mr. Berkeley has seen four little spicules of equal length spring from the tips of the basidia, named by him sporophores, and on each of these at length appeared a globose spore. The shrinking of the basidia induces the pulpy state of the *Lycoperdon* preceding maturity, which is indicated by its pulverulence. At this period, all the moisture contained in the interior of the peridium being absorbed, either because the juices which made it succulent and fleshy have performed their functions of nutrition, or from some cause independent of the morphosis, the sporophores or basidia shrink, wither, dry, and remain under the form of confervoid filaments. The sporidia having become free are intermixed with the filaments, and bear still the thread by which they were fixed to their summit. The same observations have been made upon *Geaster*, and Corda (*l. c.* ii. p. 24. t. 12. f. 90.) has figured something analogous, if not quite similar, in his genus *Ptychogaster*. This singular morphosis, which brings the order of *Lycoperdineæ* near to the true *Hymenomycetes*, had been already observed by Vittadini*, who, from not having followed it in many species, still less in many groups, could not, as Mr. Berkeley has done, draw from it any general systematic conclusions.

Having seen what takes place in the normal evolution of *Lycoperdons*, let us review the principal forms assumed by the peridium in the series of genera, its texture, mode of rupture, and finally the organs of fructification which it is destined to contain. But first I would premise, that there are in this order genera whose peridium is developed on the surface of the soil (*emergens*), others in which it is not seen till it has acquired a considerable size under the surface of the earth (*innato-emergens*), and some are altogether subterraneous.

The trama of the peridium is formed by the interlacing of the filaments of which the fungus is at first entirely composed. It is formed either of a single coat of byssoid fibres (*Tulostoma*, *Lycoperdon*), or of two coats often only slightly adherent, and of which the outer one falls at maturity (*Bovista*). In the *Geastra*, where these two coats are very dissimilar, we may consider them as two peridia, of which the outer†, which is coriaceous or tuberculated, splits from the top towards the base to a greater or less extent into several rays or laciniaë, expanded like a star, or recurved, and contains from the beginning the first which is sessile, uni- or pluristipitate (*Geaster coliformis*), always thin, membranous or papyraceous.

In a single exotic genus *Mitremyces*, where the peridium is like-

* Monog. Tuberac., p. 20 and 83. t. 5. f. 9 e.

† In *Geaster triplex*, Jungh. (Tijdschr. voor natur. Geschied. en Physiol. 2-3 Stuck, 1840. t. 8. f. 1, 2, 3) the outer peridium is composed of two separable layers, of which the inner forms a broad cup, and the outer is divided regularly into recurved laciniaë.

wise double*, the inner, whose increase does not keep pace with that of the outer, appears to enjoy a sort of elasticity, analogous to that which we observe in *Sphaerobolus*, which causes it at a certain epoch to invert itself for the dispersion of the sporidia †.

The peridium is simple or compound. In the first case it presents a single cavity, or it is divided into cells or pockets (*e. g. Scleroderma*) ‡. In the second it encloses a number of partial or secondary peridia (*peridiola*), within which are enclosed the sporiferous filaments (*e. g. Polysaccum, Ciliciocarpus*). In the emergent species the mycelium furnishes the peridium either with a stem or peduncle (*stipes*), which is continuous in *Mitremyces*, only contiguous in *Tulostoma*, or merely with some root-like filaments, which are altogether wanting in the subterranean species. The stem itself, sometimes very short and obsolete, is likewise frequently prolonged into the peridium in the form of a columella. This is soft and cottony in *Cauloglossum*, hard and woody in *Podaxon*.

As regards the dehiscence of the peridium, we have just seen that it is twofold in *Geaster*. In the emergent genera it mostly takes place towards the summit, rarely laterally (*e. g. Cauloglossum*), or at the base, as in *Podaxon*. It is often regular or irregular in different species of the same genus. The irregular mode of rupture takes place by the peridium being torn or broken into scales. The regular dehiscence, which is always observed at the summit of the peridium, consists of an opening sometimes exactly orbicular, obtuse, or surmounted by a cartilaginous border (*e. g. Tulostoma mammosum*); sometimes conical, folded and finely striate, or slashed into laciniae; sometimes plane, ciliate or dentate; sometimes also pilosofimbriate (*e. g. Lycoperdon*). The genera whose species are subterranean do not open spontaneously (*e. g. Cenococcum*). In *Geaster coliformis*, which seems to result from the normal confluence of several peridia, the single peridium opens by many ciliated orifices.

The flesh of the fungus is generally white or reddish in this tribe; but after the morphosis, which induces pulverulence, the mass of the filaments of the sporidia presents variations of colour in each species. The most common tints are purple-brown, olive, fuliginous with a yellow tinge, cinereous or bluish black, &c. The filaments, which constitute the fleshy mass with which the young peridium is filled, vary likewise considerably in the changes they undergo by the act of vegetation. The two extreme states are their persistence under the form of capillitium (*e. g. Lycoperdon*), and their complete absorption § (*e. g. Cenococcum*). In the multitude of intermediate states there are two worthy of notice; that where the capillitium, detached

* Or rather triple, for at the moment of its appearing on the surface of the soil the peridium is enveloped in a hood (*calyptra*), which bursts circularly at its point of attachment to the stem, and falls.

† Berkeley, Ann. of Nat. Hist. 1839, p. 326.

‡ Messrs. Tulasne, in the paper quoted above, have proved that the structure of *Scleroderma* is in reality conformable to that of *Lycoperdon*.—M. J. B.

§ Mr. Berkeley has found filaments mixed with sporidia in *Mitremyces coccinea*, l. c. t. 7. fig. 1. c.

from the peridium, remains under the form of free filaments which are dispersed with the sporidia, and that in which they form by their union the walls of the cells in which the sporidia are contained. This latter circumstance takes place especially in the subterraneous indehiscent Lycoperdons.

The genus *Polysaccum*, DeC., has a common peridium, in the fleshy cellular mass of which appear at first amygdaloid, extremely soft and viscid bodies. As the fungus increases they become consistent, and are at length changed into peridiola, in the interior of which the complete evolution of the spores observed by Corda (Ic. Fung. ii. p. 24. t. 12.) takes place. The other species of the subterraneous genera offer almost the same morphosis.

The sporidia differ very little from those of the preceding tribe. Some have an umbilicus or hilum, and some retain the thread or cord (*funiculus*), which however is generally wanting. Most are smooth, but some are verrucose. I have already said, that in their pulverulent state they are generally mixed with the mass of filaments from which they spring. Sometimes this powder occupies the whole cavity, sometimes only a more or less circumscribed portion of the peridium. A dry state of the atmosphere is most favourable to the dispersion of the sporidia, and the wind the most effectual agent. In the subterraneous species, where they are agglutinated by the drying up of the viscid matter which assisted in their evolution, strong and continued rains are probably the most efficient.

Almost all the species grow either upon or beneath the earth; *Tulostoma exasperatum*, however, and a very few others live on half rotten wood. Some are found exclusively in sand*. They have their centre in the temperate regions of the two hemispheres. Their use is very limited. Some authors affirm, that in certain parts of Italy many sorts of puffball are eaten fried while they are still fleshy. Deer and pigs are reported to root up the *Elaphomyces*. The sporidia of *Polysaccum tinctorium* are used in the Canaries to dye wool and silk.

The *Angiogastres* comprise, as we have seen, three tribes united by a common character, sporidia never pulverulent; they are, however, distinguished by marked differences. Thus, the *Nidulariaceæ* have their sporidia enclosed in proper sporangia; in the *Tuberaceæ* they are contained in the thickness of the folds of the peridium; lastly, in the *Phalloideæ* they are dispersed in a fœtid mucilage which clothes the receptacle.

The *Nidulariaceæ* comprise a very small number of genera, all having a double peridium. The outer is called *uterus*; it varies in form, which sometimes resembles a cup or little goblet (*e. g. Nidularia*), sometimes is spherical (*e. g. Arachnion*), sometimes hemispherical (*e. g. Polyangium*); and as regards consistence, it is cottony, slightly fleshy, coriaceous or membranaceous. The inner, separable or intimately united with the first, is most frequently papyraceous

* *Podaxon cuscinomalis* is found on ant-nests.—M. J. B.

or membranous. In certain genera it is inverted elastically, in order to shoot out the sporangia (*e. g. Sphærobolus*).

The receptacle is entire, and opens at the summit by a circular or toothed orifice; or it is truncate or dimidiate, and closed by a thin membrane called *epiphragma*, which bursts to make way for the sporangia (*e. g. Cyathus*). These at first swim in a more or less consistent mucilage which at length disappears. They are free or fixed to the peridium, sometimes laterally, sometimes by the centre, by means of a sort of cord. Their consistence is sometimes hard and firm, sometimes more tender. The sporidia which they contain are of a variable colour, and generally collected in the centre. These fungi grow in autumn, and are, as far as is known, of no use. Their morphosis, which has not been followed, demands the attention of mycologists favourably situated for such observations.

The *Tuberaceæ* form an important tribe, whether on account of their structure, so well explained by Vittadini, or their use for food. The species have a single or double peridium. This peridium, when single, or the internal, when there are two, is folded more or less deeply into the interior of the fungus, so as to form veins of different colours, giving it a mottled appearance. The sinuosities formed by the folds of the peridium, which Vittadini has well compared to those of the brain, do not proceed always from every point of the circumference, as in the genus *Genea* (Vitt. Mon. Tub. t. ii. f. 7.); more frequently, in the root-bearing species, the folds radiate towards the summit from the point which is in contact with the soil; in some cases it is from the centre that they diverge. The outer peridium, which is wanting in the curious genus *Gautiera*, is frequently floccose or byssoid. In the species with a tuberculated bark, this is formed of very small and crowded elliptic cells. These cells, according to Vittadini, serve in the Truffles for the absorption of the juices necessary for their growth, and perform consequently the functions of roots. The flesh of *Tuberaceæ*, especially remarkable for its veins, is of a different colour in different species. Its consistence and hardness increase with age, which is the reverse of what takes place in *Lycoperdaceæ*. We see at once the analogy which closely binds certain genera of this order with *Hymenomycetes*, and others with *Discomycetes*. *Gautiera graveolens* is indeed very near to the Morells, and *Genea* is an introverted *Helvella*. In both cases, the organs of fructification, being disposed in an inverse manner, do not receive the action of the air and light till after their dispersion.

It would take too long time to review the forms which the peridium assumes in the very numerous genera of this tribe; it is enough, after the Italian monograph, to have indicated the origin of these inner veins, which wise and provident nature has employed to multiply the points of the fructifying surface without increasing too much the volume of the plant.

If we examine the parenchyme of *Tuberaceæ*, we recognise besides that it is composed of cells differently fashioned, but in general rather rounded than elongated. Between these cells, we observe from space to space cavities very variable in their form. The one,

which are mere lacunæ, contain peridiola in which are enclosed the sporidia, which are often filled with sporidiola; others, larger, are lined with a membrane or hymenium, composed of juxtaposed cells. It is in the interior of these cells that the sporidia are contained in the genus *Genea*, and from between them that those of the genus *Rhizopogon* emerge. In some other utero-hymenian genera, the sporidia are borne by a minute peduncle, which is formed at the summit of the basidia. In the genera *Pachyma* and *Picoa*, where there is no trace of veins, the peridiola nestle here and there in the flesh of the fungus.

The sporidia of the *Tuberaceæ* are then generally contained in asci or peridiola. They are seldom smooth, more rarely striated longitudinally. Almost always, on the contrary, they are rough or echinulate, a circumstance which made Turpin regard them as the truffle in miniature. Vittadini, who has studied the germination of those of *Elaphomyces**, which are echinulate, has seen these points elongated into byssoid filaments, which at length envelope the seed in a thick down. This down, according to the author, is as it were the cotyledon of the young plant. He infers by analogy, that the same is the case with the sporidia of most other *Tuberaceæ*. The fungi, which generally are subterraneous, prefer temperate climate, and are found especially in forests of oak and chestnut. Truffles, known to Theophrastus under the name of οἰδύρον, and to Plutarch under that of ἰδύρον, have long been esteemed† for their delicious flavour. Everybody knows that they are nutritive and aphrodisiac, and that pigs are quite as fond of them as ourselves†.

We come now to the *Phalloideæ*. The species which compose this tribe, though we derive no immediate benefit from them, are nevertheless worthy of arresting for a moment our attention, because they form a very evident passage from true *Gasteromycetes* to *Hymenomyces*; they approach the latter by the constant presence of a volva, but especially by the structure of their hymenium. This structure indeed has been observed only in the genus *Phallus*; but, till new investigations show us the identity of structure in the other genera, analogy leads us to suppose that it does not differ in the rest of the tribe. It is to Mr. Berkeley again that we are indebted for this interesting discovery. What he has seen in *Phallus caninus* is as follows: as in the puffball, the fructiferous membrane is formed of a very sinuous hymenium. The walls of these sinuosities are composed of elongated cells, a little clavate at the tips, and surmounted by from four to six threads, each bearing an oblong spore (Berk. l. c. p. 164. t. 2. f. 22, 23). The basidia appear all to be fertile and of an equal length. We have then here an Hymenomycete which is distinguished from the others merely in the sporidia being soon involved in a mucilaginous mass derived from the hymenium.

* See, on the subject *Elaphomyces*, Messrs. Tulasne's admirable paper, Ann. Sc. Nat. July 1841.—M. J. B.

† Many other species of this tribe are eaten. In the Canaries, a species is much esteemed which I have referred doubtfully to *Rhizopogon albus*, Fr., but which is perhaps *Tuber niveum*, Desf., a species at present unknown. Hist. Nat. Canar. Phytogr., sect. ult. p. 85.

In all the species of this group, the young fungus is wrapt in a general volva (*uterus*, Fr.), which is sometimes double. This pouch, which is usually white and membranous, and which contains the receptacle, is separated from it by a more or less thick layer of mucilaginous matter, frequently of a fœtid, cadaverous, goaty, spermatic or musky scent, sometimes quite scentless. The volva bursts towards the summit in order to make way for the receptacle, which then increases rapidly.

Sometimes this receptacle consists of a little head (*capitulum*), which is smooth or rugged (*e. g. Phallus*), smeared with a coat of this jelly with which we have seen the volva was at first distended*, and supported by a fleshy stem or peduncle, or rarely woody, as in *Batarrea*; generally fistulose, smooth or reticulate. Sometimes the receptacle, which is still stipitate, is divided at the top into expanded and bifid rays (*e. g. Aseroe*), erect and simple (*e. g. Calathiscus, Lysurus*). Sometimes sessile, as in *Clathrus*, or pedicellate, as in *Fœtidaria*, A. St. Hil., it presents a sort of convex, ovoid or turbinate peridium, or rather a sort of net with rounded meshes, smooth or striate, in the interior of which is contained the gelatinous medium which involves the sporidia when the time of their dispersion is arrived.

The genus *Batarrea* is anomalous; its vegetation is phalloid, but its fruit is that of *Lycoperdaceæ*; indeed the naked sporidia are mixed in the pulverulent state with filaments springing from the receptacle.

All the Fungi of the tribe which we have just examined spring from beneath the soil, or on its surface; their growth is wonderfully rapid. *Batarrea Gaudichaudi*†, found at Peru, near Lima, acquires all its development in a few hours. They are of no use to man‡.

Note.—This is, on the whole, the least satisfactory of the six grand divisions of Fungi, and must doubtless be greatly modified hereafter. The affinities of *Nidularia* and its allies are at present very ill understood, and both *Hymenomyces* and *Discomyces* will be reinforced by far the greater portion of its other components. The great desideratum is a correct knowledge of the morphosis of *Myxogastres*, and the genus *Trichia* is especially worthy of study, as its flocci are clearly not mere relics as those of *Lycoperdon*. The notion that *Sclerotium* is allied to *Sphæria* is very ingenious, and is perhaps strengthened by the fact that *Sphæria phœcomes* and others are *Sclerotia* in an early stage of growth.—M. J. B.

* M. Legrand (Act. Soc. Linn. Bord. v. June 1832) has shown that in *Phallus vulpinus*, an excellent species described by him, this jelly, which is inodorous, diminishes as the fungus increases, and that it dies almost immediately if it is taken away before the fungus has arrived at maturity. It seems to him consequently intended by nature to furnish the nutritive matter indispensable for the evolution of the *Phallus*. Some mycologists have supposed, without any ground, that it contains the fecundating principle. Its odour is very variable; it is fœtid in many species; none in *Phallus caninus, vulpinus* and *indusiatus*; it has somewhat of a spermatic scent in *P. aurantiacus*, n. s. from the East Indies (Ann. Sc. Nat. Nov. 1842).

† See Mont. Ann. Sc. Nat., 2 sér. tom. ii. p. 76. t. 4. f. 1.

‡ *Lysurus Mokusin* is considered by the Chinese as an excellent remedy in gangrenous ulcers. It is also eaten; but it appears to be often poisonous.